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ABSTRACT

Presented are case histories of two Down's Syndrome (Mosaic form) 6- and 10-year-old girls who attended regular Montessori classes. General characteristics of Down's Syndrome and other retarded children are reviewed and compared with the two girls' growth and development (according to Piaget's proposed stages). The Montessori emphasis on sensorial activities and on individual freedom to choose tasks is seen to enhance the retarded child's development. Analyzed are the girl's progress in such skill areas as language, reading, and math. The children are said to be functioning in Piaget's preconceptual and intuitive stages. Emphasized is the need for an approach which includes raised social and academic expectations along with instruction in independence and self-direction. An appendix lists suggested Montessori materials and activities for handicapped children. (CL)

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CASE STUDIES OF TWO DOWN'S SYNDROME CHILDREN FUNCTIONING IN A MONTESSORI ENVIRONMENT

by

Barbara J. Schramm

RESEARCH PROJECT

Submitted to the Graduate Committee of the School of Education
University of Dayton, in Partial Fulfillment
of the Requirements for the Degree
Master of Science in Education

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INTRODUCTION

Purpose of the Project This paper has been written from the point of view that retarded children need to experience inter-relationships with normal children in self-choosing environments in order to develop normal behavior patterns and encourage better growth in language and overall total development. It is the writer's intention to illustrate how these children might function in such an environment by showing how two children have been accommodated in regular classes in an AMS* certified Montessori School. Specifically, the study explored the overall growth and development of two Down's Syndrome (Mongoloid) girls functioning in a Montessori environment, and the comparison of their growth with expected standards for Down's Syndrome children. Piaget's studies were used as a guide to determine the normal sequence of growth and development in children.

Identification of Subjects The two girls are presently attending the Montessori School. The study covered their growth and development from birth to March, 1974. Jennie's age was six years, four months; Lynne was ten years, nine months in age. Both children were first born and the parents were in their early twenties at the time of their birth. Both girls have had chromosome analyses and have been verified as having the Mosaic Form of Down's Syndrome. In March, 1974, Lynne and Jennie were given the Peabody Picture Vocabulary Test and the Vineland Social Maturity Scale. Lynne scored 54 on the P.P.V.T. and had a SQ (social quotient) of nine

*American Montessori Society, 175 Fifth Ave., New York, N.Y. 10010.

years on the Vineland. Jennie scored 59 on the P.P.V.T.. and had a SQ of five years.

Both girls have been further evaluated on a comprehensive study used by the Retarded Children's Program in their city. The study includes self-help and social skills, as well as abilities in tactile perception, visual perception, motor expression, language assessment, written communication, reading, and numbers. Lynne was able to perform independently over 75% of the skills listed in the study, while Jennie was successful at over 50%.

Lynne, at nine years, 11 months was also given the Stanford-Binet Intelligence Scale and scored an IQ of 53.

Lynne: Lynne was borne on June 22, 1963. She was the only child in her family until she was nine years old. For the first eight years, Lynne was the focal point around which most of the home's activities centered. Her mother spent a great deal of time helping and encouraging her to learn. This attitude of acceptance and love was reflected by Lynne's relatives and friends and she has been extremely fortunate in this respect.

When Lynne was 2½, her mother began inquiring about schooling. At the time, the retarded program in their area did not take very young children. Upon further inquiry, it was learned that a Montessori school had been established in 1961 in their city. Since interest in the Montessori movement in this country had just been re-generated in the late 1950's, the fact that a school had already been in operation for several years was fortunate. The founder of the school had been in the second training course in the United States.

After an interview, Lynne was accepted in September, 1966. There was and has always been a genuine effort put forth by all

of Lynne's teachers to treat her as normal, making sure that no exceptions to the room's ground rules be made because of her handicap.

Jennie: Jennie was born on November 8, 1967. She was also an only child until February, 1974. Jennie's parents were greatly concerned that every opportunity be given Jennie that she might realize her full potential. It was this concern that led them to inquire about the Montessori school in their city. When they visited the school, they were able to observe Lynne. At the time, Lynne was seven and had been reading for two years. They were able to hear Lynne read and see her general progress. The decision to enroll Jennie was affirmative.

As with Lynne, the same policy of normal acceptance was shown Jennie. The usual, customary classroom procedures and ground rules were expected of her. Also, there has always been a positive belief that these children could do all the activities the other children did, if these activities were presented at the right time and in an understandable way. If this meant breaking the exercise down to a more simplified form this was immediately done.

Approach to the Project. The progress of these two Down's Syndrome children was contrasted with the general growth and development of Down's Syndrome children attending the retarded children's program in their city, and with the general progress of a few Down's Syndrome children attending other Montessori schools.

Preparation of this paper was preceded by the following steps:

A. Study of related literature.

B. Contact with other Montessori schools in regard to finding retarded children in their programs, and discovering their general progress to date.

C. Surveying schools in the area accepting Down's Syndrome children in their environment.

D. Observations of Down's Syndrome children presently attending schools for the retarded.

E. Interviews with educators for their views and comments.

Organization of Study. Three major sections are presented. The first section provides a review relative to the characteristics of 1.) Down's Syndrome children, 2.) Montessori environments, and 3.) Piaget's developmental stages. The second section furnishes an analysis of the growth and development of the two subjects in relation to, 1.) their own specific growth, 2.) Piaget's works, and 3.) the general progress of other retarded children in public and private educational programs and other Montessori schools. The third section concludes by summarizing the implications of self-choosing, individualized, environments for the education of retarded and normal children alike.

REVIEW

Characteristics of Down's Syndrome Children.

Down's Syndrome or Down's Disease is the now accepted term for what was formerly known as Mongolism. The name Down's Syndrome is taken from Langdon Down who in 1866 first delineated the condition. Down originally called the disease Mongolism due to the outward resemblances of these individuals with the physical characteristics of some Mongolian people. However, objections arose to these ethnic references from the Mongolian people and subsequently the condition has been renamed Down's Syndrome.

Quite co-incidently in the same year, 1866, Sequin labeled Down's Disease as a "furfuraceous cretinism." (Sarasen and Doris, 1969, 363). This statement referred to the dry, scaly, and sometimes flakey skin which often characterizes these individuals, along with their stunted physical and intellectual growth.

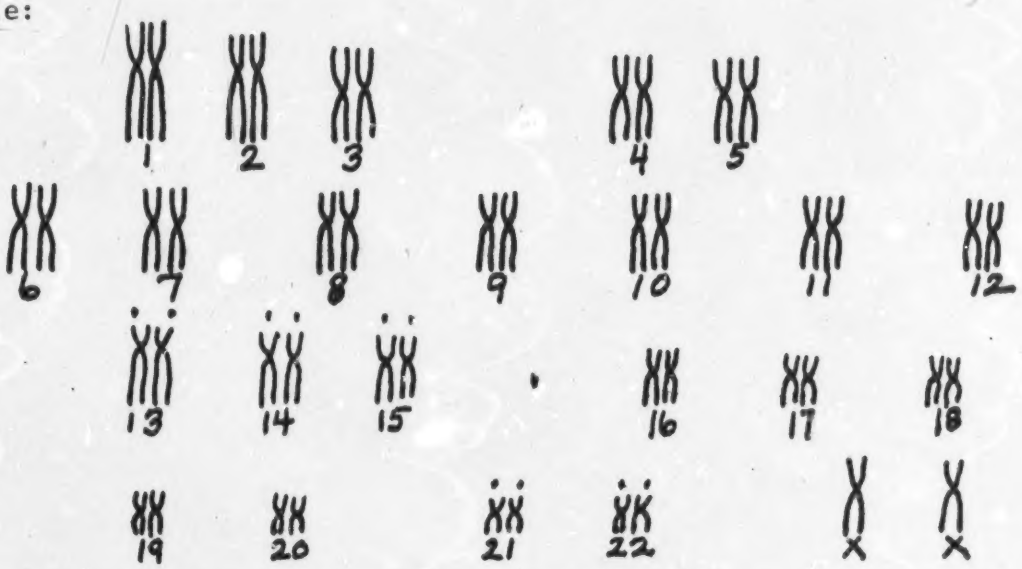
Nearly a century was to elapse until any significant information on Down's Syndrome would appear. In 1959, Lejeune, Gautier, and Turpin discovered that Down's Syndrome individuals have a chromosomal abnormality. This was the first Chromosomal defect discovered in man. It was found that the majority of cells in these individuals had 47 chromosomes instead of the usual 46. The additional chromosome seemed to be located in what is referred to as chromosome pair 21. This is, in fact, the most common form of Down's Syndrome and has subsequently been termed the Trisomy 21 type.

To explain further, genes, those factors or elements

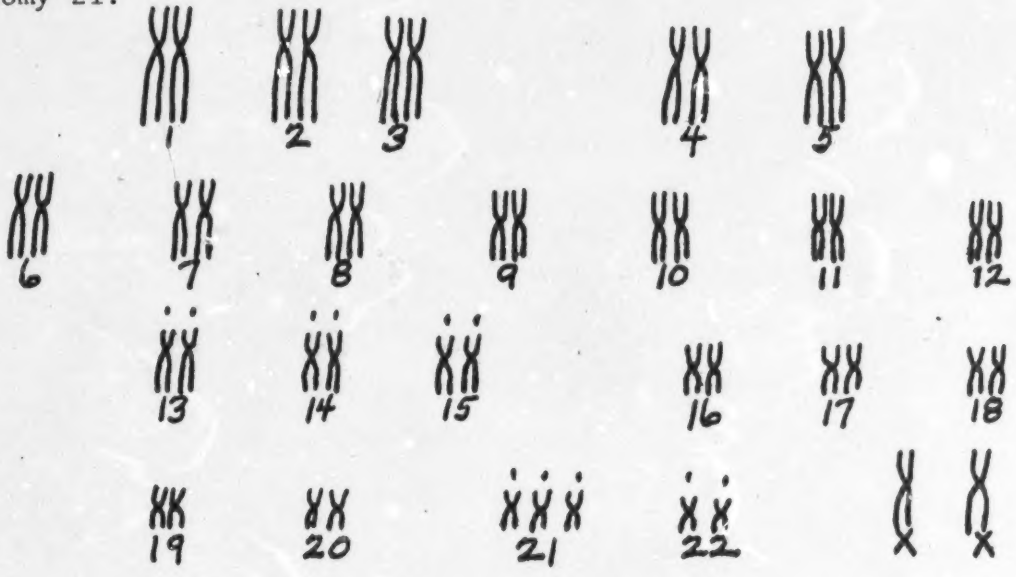
considered influential in transmitting hereditary characteristics, are grouped together in larger units called chromosomes. The somatic cells in man - those cells which form the tissue, organs, and parts of an individual - are distinguished by a certain number of chromosomes. This specific number of chromosomes is identified as diploid in number. In other words, these somatic cells have twice the number of chromosomes that a normal gamete or sex cell has. Sex cells are haploid (half) in the number of chromosomes they contain. This is due to a reduction division procedure which occurs during the development and maturation of the sex cells.

In fertilization, the female and male sex cells unite so that the resultant cells or zygotes are again diploid in number. If an error has occurred during the reduction division phase in the development of either a sperm or an egg cell, and such a sex cell takes part in fertilization the resulting zygote will have an overabundance or insufficient amount of chromosomes. Hence, the subsequent offspring will also have an abnormal chromosomal count, which can produce a more or less severe imperfection in the individual.

The following is an illustration of a Karyotype* of a normal female:



Illustrated below is a Karyotype of Down's Syndrome female with Trisomy 21:



*Karyotyping is the photographic process by which chromosomes are numbered and paired according to their size, shape, and other similar characteristics.

Two exceptions to the usual Trisomy 21 Type of Down's Syndrome are first, the Translocation Type of Down's Syndrome.

> In 1960, Polani, Ford, Briggs, and Clarke observed a mongol girl with only 46 chromosomes. It was postulated that a reciprocal translocation had occurred between 2 chromosomal groups, one of which was probably group 21. Specifically, a break had occurred in one of the chromosomes and the broken part was transferred and fused with one of the chromosomes of another group. The fertilized ovum containing an extra piece of chromosome produces the same clinical consequence of mongolism as in Trisomy 21.....Other ways by which translocations can occur have been postulated, and from various cytogenetic surveys of mongols, it has been estimated that about 2 to 3 percent of mongols are translocation mongols.
>
> The importance of translocation mongolism is that the translocated chromosome is carried by a normal person and passed through several generations; this is one of the major reasons for the familial occurrence of mongolism. (Lillienfeld, 1969, 2)

The second exception is the Mosaic Form of Down's Disease in which

> the individual shows an admixture of normal and abnormal trisomic 21 cells in varying proportions. Such mosaic forms may result from an error in mitotic division of a somatic cell after the formation of a zygote. The proportion of trisomic cells in the bodily tissues might then depend upon how early in embryonic development the error occurred. In such individuals the number of features of Down's Syndrome observed and even the intelligence of the individual may vary with the proportion of normal and abnormal cells.
> (Sarason and Doris, 1969, 376-377)

Clark, Edwards, and Smallpiece first confirmed Mosaic Down's Syndrome in 1961. Since then several types have been diagnosed. Tsuboi (1968) has found that some Mosaic children

are in the upper IQ range 65 - 100. He has found this to be true if the number of normal cells is higher than the trisomy 21 cells. However, if there is a higher proportion of trisomy 21 cells, the individual will tend to be more severely retarded. Mosaic subjects with over 50 percent of trisomic cells seem to show typical Down's Syndrome characteristics. Consequently, there are also Mosaic individuals in the imbecile and idiot ranges in intelligences.

There are innumerable characteristics, involving almost every organ system in the body, attributed to those having Down's Syndrome. All are not present in any one person. However, a significant number of these characteristics will appear in a typical Down's Syndrome child.

Generally, Down's Syndrome individuals have a short, broad head, the back being somewhat flat and usually small in size. Likewise, their necks are also short and broad. A rough, dry complexion causes their cheeks to be red. Similarly, their hair is also dry and coarse. They have slanted eyes and can often have numerous eye problems. Their ears, too, are small and often show some malformation. The small nose tends to have a depressed nasal bridge. A small mouth cavity and enlarged, furrowed tongue, plus a narrow palate, which is high and arched, account for some of their speech difficulties. Their mouths continually have a tendency to remain open. Again, their teeth are small and usually show irregularities. Very often they have a crease in each palm which runs horizontally across the entire palm. Their hands are broad with short stumpy fingers. They

can have a somewhat short, curved little finger. The first toe is larger and there is an unusual amount of space between the first and second toe.

In many cases, children having Down's Syndrome may have heart difficulties, a fragile respiratory system, as well as circulatory problems. These children also seem to require more sleep than other children.

According to Penrose (1962), Down's Syndrome children usually exhibit a mental ability that is moderately to severely retarded. An IQ of 50 or below is expected and performance indicative of a mental age of seven or below is the general rule. This restricted, yet prominant belief has led many physicians, educators, social workers, and adults in general, to advise institutionalizing these children.

Hopefully, this trend is beginning to change. More children with Down's Syndrome are being reared at home. Innes and Kidd (Haywood, 1970) found that more children with Down's Syndrome were kept in the community than children of a similar IQ range. They interpreted this as a sign of growing acceptance by society towards these children.

A wide variance in IQ range is also being recognized.

> Recent studies dealing with the psychological characteristics of mongolism which have focused on IQ indicate that the range of intelligence in mongoloid children varies considerably. Although Bleyer (1937) believed that the IQ of mongoloids never surpasses 60, and Penrose and Smith (1966) and Tennies (1943) have cited 15 - 29 and 7 - 48 respectively as the most likely range, current research indicates that higher levels of IQ exist in noninstitutionalized children, and that environmental factors

> associated with differences in upbringing may contribute to higher IQ levels.....home reared mongoloids perform within the moderately to mildly retarded range on IQ tests, while institutionized children tend to function within the severely retarded range.....
>
> The social growth and development of children with Down's Syndrome also shows considerable social quotient (SQ) scores and improved social competence in noninstitutionalized children. The latter could be attributed, in part, to environmental influence (Centerwall and Centerwall, 1960; Lyle 1959, 1960a, 1960b; Quaytman, 1953; Shipe and Shotwell, 1965; Stedman and Eichorn, 1964; Tizard, 1960). Kugel and Reque (1961) noted greater speed of acquisition of motor and speech skill by home-reared children, and Lyle observed an acceleration in the development of verbal behavior when the social milieu was reorganized to resembly a family type of residential unit.
> (Cornwell and Birch, 1969, 341 - 342).

Evidence of Down's Syndrome children operating on IQ levels of 60 to 70 is coming forth.

> Benda (1960) notes that the number of mongoloid children who maintain an IQ of 60 to 70 is not as small as some studies would suggest.....Benda emphasized that the average mongoloid child learns to walk at 2 years and sometimes as early as 18 months. Speech, however, tends to greater retardation. The 3-year old mongol may use words and phrases but rarely speaks in sentences before 4 to 6 years of age.
>
> Benda maintains that the Standford-Binet test does not do full justice to the mental ability of the mongol. Despite the lower IQ scores, he maintains that many mongols are actually in the educable range and are capable of developing through the first three school grades. Benda apparently takes the position that placement of mongoloid children in "trainable" classes on the basis of IQ scores is to fail to utilize the full learning capacity of many of these children (Sarason and Doris 1969, 367).

C. L. Rosecrans (1971) reported on a 5 year study of a high-IQ Mongoloid boy. The boy's appearance continually caused him to

be placed in special education classes,* which resulted in his subsequent boredom and behavioral difficulties. Because of the latter, further testing was performed. The boy, at age 10, received a Verbal IQ of 86, with a Performance Scale IQ of 68, yeilding a Full Scale IQ of 75 on the Weshsler Intelligence Scale for children. He received grade level scores of 2.8 to 4.2 in math and 3.0 in reading.

Other cases of exceptional children with Down's Syndrome have been cited from time to time. Buck (1955) told of a Down's Syndrome adult who attained a reading grade score of 8.2, and Penrose (Hunt, 1967) verifies the remarkable story of Nigel Hunt who could read at the age of 6. However, his thinking remained in the concrete stage throughout his life.

Potozky and Grigg in "A Revision of the Prognosis in Mongolism" (Buck, 1955) confirmed having studied two Down's Syndrome individuals with IQ's of 71.

Thus, Down's Syndrome children do not necessarily have extremely low intelligences and do not need to function extremely low academically or socially. Even children with IQ's in the 50 range can operate on a much higher developmental level than has previously been expected, if provided with the right kind of highly stimulating learning environment.

*These classes are often called EMR (Educable Mentally Retarded) classes and according to Cross (1970) should have an average IQ range of 50 - 80.

Characteristics of Montessori environments.

Since the two Down's Syndrome girls chosen for this study attend a Montessori school, the following is a brief summary of Maria Montessori's educational philosophy.

Maria Montessori's method of teaching is unique in its insight into the intrinsic motivation of children. This idea of self-motivation and self-learning is foremost in Montessori's philosoply. Autoeducation is the term Maria Montessori used to describe the self-motivating, self-stimulating driving force which is within every child to develop and grow--to learn in his own way.

She observed this trait first when, as a young medical doctor in Rome (1896-1906), she began working with "deficient children" in the slums. These children have been called deficient for they lacked many of the environmental stimuli which need to be absorbed by a child, if full growth and development is to take place. These children are often mentally slow or retarded because of their environmental loss. They would be those individuals whose retardation is caused by socio-economically poor conditions.

Montessori's medical background had enhanced her observational skills. As an alert observer, she became aware of the need to allow children the freedom to use their autoeducational ability. The individuality of her subjects was glaringly apparent. There was a need for a new mode of education. The ingredients of autoeducation, individuality, and freedom led her to develop a type of education which allowed the child to independently inter-react and relate to a prepared environment. Such an environment held all the skills necessary for the children to develop fully.

> Imagine a child walking into a large room filled with furniture of a Lilliputian size.....children are working on rugs and at small tables and chairs. This classroom has no assigned place for the teacher's desk. In fact, it is difficult for the visitor to find the teacher because she may be any place in the room. Perhaps she is on the floor with one or two children working on a puzzle map of the world, or at the side of a child at his table, looking with him at his work and showing him how to do it or working with him.
>
> One can see a child at work in the "practical life" area of the room, where he is getting water to wash dishes, or to scrub clothes or a table. Small mops, dust pans, and other household items are neatly placed within the child's reach. The child is performing these ordinary household tasks, not in order to help his mother to keep her home cleaner, but to learn motor control and coordination. This area of work perhaps best prepares a child for reading.
>
> In another corner of the room, a child is occupied with a teaching apparatus designed to help him to begin to understand mathematics. Another area of the room is arranged for language exercises; here, matching cards and learning the names of objects are two ways to promote reading readiness. Finally, a fourth area of the room has materials designed to help development of the senses. For example, bottles with various odors, are provided the child to compare in order to develop his sense of smell. .....the classroom becomes a small world in which children are walking about, discovering, and working together or alone in a peaceful manner. The children are learning how to learn. (Schmid, 1969, 13).

As stated above, in such an environment, the teacher relinquishes the traditional teacher role in favor of a new role--that of an observer, a follower of the child, a helper only when necessary. Oftentimes the teacher, or directress, as she is called, is obscured by busy children. This is her role--to be unnoticed, unobtrusive, and yet to be diligently alert to the needs the children have. If assistance is needed the directress

"shows" the way. Many times the directress will focus in on "one" sense only (perhaps that of sight), so the child's full powers of concentration can be deepened and not cluttered by aimless talk.

These were the procedures and techniques Montessori used with her socio-economically deprived children. They were soon applied to normal children with remarkable success. In 1912, her first book, The Montessori Method, was published and was to be followed by innumerable books and publications. Throughout these writings the themes of autoeducation and independence are emphasized.

In formulating her method of education, Maria Montessori studied the works of Dr. Jean Itard and Edward Sequin. She used Sequin's "three period lesson" to convey new knowledge to her pupils. The "three period lesson" is significant because of its ability to focus in on three different levels in the acquisition of knowledge.

The first period (that of association) allows for the presentation of two contrasting objects to the child. For instance, the teacher says, "This is an apple; this is a banana." These are the only words spoken in order to prevent any confusion to the child. Associating the sensory impression of the object with its abstract name is the primary purpose of this period. For a retarded child, this period could be repeated many times.

In the second period (the recognition phase), the teacher requests, "Show me the banana." The child is then given the opportunity to point to the banana. It is imperative to ask the child for the object that was presented last in the association

phase. This insures optimum success. If the response is incorrect, no correction is made.

> ...the only way in which to succeed would be to repeat both the action of the sense stimuli and the name; in other words, to repeat the lesson. But when the child has failed, we should know that he was not at that instant ready for the psychic association which we wished to provoke in him, and we must therefore choose another moment. (Montessori, 1964, 226)

If the correct response is given, the objects are rearranged and the procedure is reviewed until the recognition of the two objects is, indeed, firmly implanted in the child's mind. This second period is the most critical for it involves a further degree of abstraction. For a non-verbal child, it is an indication that recognition of the match of the concrete object and abstract name has been made.

The third period (that of recall) asks the child to verbally identify the items. Verbal identification is a more difficult intellectual function than simply pointing to objects.

Two factors are evidenced in this approach. First, the child almost always meets with some success. Minimum discouragement is encountered. Secondly, the teacher is given an excellent measure of the child's present functioning status. If a child can perform in the second period, and yet has difficulty with the last period, the teacher can quickly surmise that the particular knowledge desired is, in fact, emerging. If the material is not being learned, there could be either an error in the presentation, or possibly, the developmental ability and/or interest level of the child has not progressed to that point.

Sequin's method has proven effective especially for the retarded because it uses only two contrasting items at a time. The procedure is simple enough in content to allow even very slow children success.

This success factor permeates every aspect of the Montessori approach. In creating a Montessori environment there are endless sensorial activities that can be included. These activities, especially if broken down to their simplest workable form, can be successfully accomplished by retarded children. R. C. Orem (1969, 56-60) has listed at length various exercises he has observed in use by special children in Montessori schools. The list is included in the Appendix I of this paper.

Lena Gitter in The Montessori Way has stated that

> .....Underneath her (Maria Montessori) particular techniques lay a view of life which perceived that everything in nature, including every human being, has a task to fulfill and a role to play in the great chain of life.....Montessori's cosmic education is scientific, not to develop scientists or to advance technology, but to teach that reverence for all life without which we cannot grow and develop as human beings. In this way of looking at the life around us, we come to understand that the special child also has his task to fulfill in life, which is uniquely his. He is the one who eagerly and joyfully does those tasks which are boring to others. Because he develops slowly, scientists have been able to conduct careful studies which teach us a great deal about all human development by working with these children. They are part of our common humanity. (Gitter, 1970, 249)

Montessori envisioned her classrooms as miniature replicas of this common humanity. Two elements in particular make it possible for the special child to indeed be part of the "common humanity" in a Montessori classroom. These two characteristics

are first, the individual freedom these children have to choose those activities for which they are ready, and in which they can experience success; and secondly, the age span (usually three years) of the children in the class. Because of this age span, the children cannot all be doing the same activities. This not only promotes individual activities, but eliminates a large amount of comparison. The idea that everyone should be doing the same work because they are all five, is alleviated.

Hence, the Montessori environment holds within its framework, the possibility of success and maximum growth for the retarded child.

Characteristics of Piaget's Developmental Stages. As Montessori had done, Piaget has used the tool of observation to study the simplictic behavior of a few children, instead of calculating responses from hundreds of samples requiring complicated controls and statistical data. The basic childhood events which he analyzes are in great contrast to the elaborate theories of cognitive thought he has developed.

One of the most noted scientists of our times in the field of child development, Jean Piaget's work has offered those working with children a developmental sequence that is most useful and helpful.

As early as 1943, Barbel Inhelder in Geneva attempted to correlate Piaget's studies of cognitive development to the development of the mentally retarded. Inhelder feels that mentally retarded persons are able to experience Piaget's concrete operations phase, which furthers problem solving techniques and en-

hances organizational thought procedures, but that they fail to perform his formal operations phase, which develops serious levels of concentration and reasoning.

John Flavell of the United States has studied Piaget's results, applying them to the mentally retarded, and Woodward of the United Kingdom has likewise correlated Piaget's work with his own in the field of mental retardation.

In order to comprehend the continuity and succession of growth, Piaget has used developmental phases or stages. These stages denote only the direction of progress or method in which development takes place. Each stage is comprised of a series of systematically interdependent functions of activities occurring in a developmental sequence usually within an average age span. According to Woodward, this average age span would be prolonged for the retarded child, but the continuous progression of development would be similar.

Piaget is particularly adamant in his insistance in the continuity and successive order of his stages of development. Each developmental level is prefigured in a previous stage and extends into the forthcoming phase. Each phase also utilizes the processes from the preceding stage in repetitious nature only with a new higher level of mental organization. Old forms of behavior are instinctively perceived as non-acceptable and are therefore, intergrated in a new advanced way into the forthcoming stage.

The sensory - motor phase (normally 0 - 24 months) is an extremely concrete stage. For the infant, materials exists only

if they are in his immediate sensorial range. During this stage, play becomes an expressive function of the developing child. Repetition of learning behavior is a fully satisfying experience. The child begins to imitate. Towards the end of this phase, the ability to remember details makes it possible to imitate the characteristics of others.

In general, for the mentally retarded child, the sensori-motor phase could well last until four or five years of age or longer. While language generally begins for the child with Down's Syndrome around the age of three, it would still fall within their sensori-motor stage of development.

The pre-conceptual stage (normally 2 - 4 years), extends its emphasis on the investigative powers of play. Again this stage would be delayed and prolonged in the retarded child. Play is the foremost activity. It helps to broaden the child's awareness of his previously acquired knowledge. For the child, play has all the elements of reality. It is not just fantasy. Repetition of real-life situations helps the child become aware of the hows and whys of everyday life. The child uses language and imitation in his play. These three - play, language and imitation - in a slow, meticulous manner, lead to socialization, that is, communication with the outside world. Severe retardation of these three elements leads to autism and withdrawal from the influence which the environment should have upon the child.

In this pre-conceptual stage the child, who at this time is totally egocentric, uses his newly acquired language to replace his previous dependence on sensori-motor behavior. His language consists of subjective thought. Things are judged solely

on how he views them. There is a great deal of personal reference in his language. Nevertheless, even in its beginning forms, language is the tool which is used to translate thoughts into words. It necessarily precludes generalization and understanding of objective concepts. However, symbolic thought is beginning to come into existence.

The child's thought processes during this pre-conceptual stage cannot combine qualitative and quantitative characteristics. Thus, the child is unable to understand the concept of time which depends upon combining concepts of objects, space, and causality into temporal interrelationships.

Also, at three or four, to win means to successfully complete whatever one is doing. To the child, it seems logical and perfectly in order that there could be more than one winner so long as his own activity is not interrupted.

The intuitive stage (normally ages 4 - 7) finds the child's verbal ability increasing and there is a definite improvement in the organization of thought. Logic becomes symbolic and its functioning also improves. In the development of these better thought processes, the child continues his ability to be active, although this need is somewhat lessoned and is beginning to be surpassed by verbal acquisitions. The abilities to categorize (which groups items according to similarities), to understand relationships according to differences, and to comprehend numbers begin to surface. Number development utilizes the concepts of classification and order. In addition, the child's observational powers give rise to further need for experimentation.

Concrete operations (age 7 - 11) is considered to be the last stage through which a retarded individual could pass. The child's constant and fast rate of learning gives rise to a constant flow of problems. Disequilibrium occurs in his thought. Coping with oneself and the external world become paramount. Successful understanding of these two forces can lead to accommodation and a restructuring of thought. However, if contradictions between the environment and oneself cannot be resolved, the child is left with emotional disturbances.

The thought processes improve to such an extent that they become automatic, instinctive, and one with the other elements within the individual. They are characterized by the following:

1) Combinativity - This is the ability to classify comprehensively. Two classes can be incorporated into one class. For example, dogs and cats can form one class, that of animals.

2) Reversibility - This is the most highly developed of the characteristics of mature thought. It is the process by which logic and math operations can be neutralized by reverse operations. To explain, pouring water back and forth using containers of different shapes will not change the amount of water. The mental ability of reversing the pouring leads to conclusions which a child in a previous stage cannot grasp.

3) Associativity - Several operations can be put together in any combination. For example, 2+0+1=3; 2+1+0=3; 0+1+2=3.

4) Identity - Operations can be invalidated by their opposites. Thus, if you walk forward, then backward, you are at the original point.

5) Logic - Repetition of a verbal statement does not change it.

In the concrete operations phase, the above processes still require the use of concrete materials.

However, in the following stage, (that of formal operations, usually 12 years of age to adulthood) these thought processes can be exercised abstractly with verbal concepts. Retarded individuals aren't thought to be able to perform at this level of abstraction.

ANALYSIS

In relation to specific growth - Lynne: Lynne is ten and a half years old and has attended the Montessori school since the age of three.

Her very early development shows that she sat alone at nine months, started crawling on her stomach at ten months, could creep on her hands and knees at 18 months. For all these activities Lynne's mother encouraged her and helped her along. When Lynne was seven months old, her mother began helping her sit by releasing her hold on Lynne's back for a few seconds at a time. The release time was increased gradually until Lynne's muscles were able to support her independent of any outside support. Likewise, Lynne's mother would crawl with her and made this very difficult motor activity fun. This was especially important when Lynne was beginning to crawl in order to establish the right attitude towards learning to tackle difficult tasks.

Lynne walked at 27 months. Her first words were said around two years of age, although additional words were very slow in coming. She could not speak in sentences until around six. Even then she preferred using one or two words to convey ideas rather than three word sentences.

During these first years, as well as when she was three and sometimes even at four, Lynne took long two to three hour naps in the afternoons. She also went to bed generally by 7:00 each evening and slept twelve hours. She seemed to require the extra sleep as is oftentimes true of these children.

Upon entering the Montessori school at the age of three

years two months, (Sept. 1966), she was placed in a class of twenty children, with one teacher and one assistant. The class was slightly older than the one in which Jennie was first placed. Lynne adjusted to the class reasonably well and enjoyed going to school.

One aspect which also proved to be encouraging was Lynne's tolerance to sickness, especially during this first year of school. She picked up colds and the flu once, but that was the extent of her illness for that year. Lynne's health, in fact, has continued to be good. Winter colds and the flu are the only illnesses she developed until she was nine when she had chicken pox.

Lynne also does not have a heart murmur, which is often present in many of these children.

After attending school for a while, it was observed that on occasion Lynne would be aggressive towards some of the other children. At times, she would slap the children smaller than herself. She seemed to relate to those her own size or bigger in a more satisfactory manner. She particularly focused on another child named Lynne. Several times the incidents occurred when the other child was asked to pass out juice or cookies. At the time it was wondered if the similarity in names was causing some confusion, or if being an only child could provoke such a response. Beadle (1970) also suggests that the traits of cheerfulness, friendliness, and loving disposition are too frequently associated with Down's Syndrome children. Some studies are revealing that aggressiveness may be caused by a genetic factor.

The next year Lynne entered a class of thirty 3 - 6 year old children, also having one teacher and one assistant. Because of the number of children in the class, there was a larger choice of materials and work available. Adjusting to this larger choice span of activities and the larger class with the added activeness which necessarily is created in such an environment was probably more difficult than adjusting to the smaller class with less work materials to choose from. However, according to her teacher, she again did well adjusting.

During this second year of school, Lynne (age four) could match colors and pictures, could do the "shape" puzzle (a puzzle containing six basic primary shapes). In fact, she was very good at puzzles. She could almost do sorting of such things as knives, forks, and spoons. She was able to do the pasting successfully, too.

Lynne could put her coat on, undress, put her shoes and socks on, and put the washing and painting aprons on. The entire handwashing sequence could be done.

This activity involves many steps, from its beginning, when a child first puts on the apron, until its completion, when everything is cleaned and dried for the next child to use. Its comphrehensive steps include getting a small pitcher of water, pouring it into a basin, rinsing one's hands, washing them with the soap, drying the basin and table so that everything is in order for the next child. For a small child, this exercise is intended to do far more than clean his hands. It strengthens his sequential

memory ability, lengthens his attention span and powers of concentration, and provides a sense of accomplishment as well as enjoyment. The water can also have a calming effect upon very active children. It was this sequence that Lynne was able to carry through.

Pouring of water from one small pitcher to another was done, although there was quite a bit of spilling at first. Perseveration (the inadvertent and uncontrolled continuance of an activity for an indefinite period of time) was also present with this pouring activity. This characteristic was frequently present in some of Lynne's other work and had to be watched.

Lynne was able to do the posting box (a wooden box with shapes cut in the top so that spheres, cubes, and other geometric solids can be put inside) as well as distinguish the three smallest cubes on the pink tower. This latter piece of Montessori material is a composite of "ten wooden cubes colored pink. The sides of the cubes diminish from ten centimeters to one centimeter. With these cubes, the child builds a tower, first laying on the ground (upon a carpet) the largest cube, and then placing on the top of it all the others in their order of size to the very smallest." (Montessori, 1965, 72)

Coloring was still at the scribbling stage. She painted her first painting during this second year. Lynne chose her favorite color, yellow, for her painting. She used verticle strokes and was also able to stay on the paper with a minimum of paint dripping off the easel. It was considered a very good first try.

It should be noted that, again, this was not a single accomplishment of putting paint on a paper. As with the steps involved in the handwashing sequence, in Montessori schools painting includes putting on your apron, getting a cup of fresh water to rinse your brushes in, cleaning your brushes upon completion of your painting, cleaning the easel thoroughly, emptying the dirty water, and leaving the entire activity in readiness for the next user. This procedure was expected of Lynne as well as any other child.

During this second year of school, Lynne had learned to choose and discriminate. There was understanding of what was told her, and she could carry out a request of one instruction.

This ability as with so many of Lynne's accomplishments, was practiced daily at home. Awareness of her limitations was accepted and understood. Lynne was often asked to get daddy for dinner. For a long time, Lynne would go to her daddy, but would then forget what she had come for. Her mother would repeat what she was to tell daddy. Lynne would ask daddy to come and be delighted when he would respond to her request. Criticism for forgetting was unheard-of.

Although still at the one word stage in language development, Lynne would repeat words readily when told to do so, and also try to say words on her own. In the area of language, Lynne could reproduce the sounds of the alphabet letters and follow the form of the sandpaper letters. These were also practiced at home quite frequently. It might be of interest that Lynne was not told the names of any of the alphabet letters. The purpose for this was two-fold. First, knowledge of the names of

the letters is not necessary for reading and secondly, the additional names along with the sounds would have increased the amount of material she had to remember and could have caused confusion. Learning only the sounds of the letters seemed to be the most efficient and easiest phonetic approach to reading.

Socialization with the other children did not occur until the next year, at the age of five.

It was during this third year of school (age five) that Lynne really began associating the sounds of the alphabet letters to some of the actual letters.

She began learning some sight words, too. She learned the words to My Kitty, the first little seven page book in the Red Beacon Series. However, before she could read this book, with its very small print, other books were made using the same words, only with much larger letters. The size of the letters seemed to make a big difference in her ability to succeed. Some of her first sight words were: my, kitty, I, see, like.

From these first books of only a few pages until she was able to go into primers (age 9) some 30 to 40 books were specifically made for her. Words in trade books were deleted and Lynne's own vocabulary words were inserted.

Three points might be stressed here. First, it was important to start Lynne's reading at the age of five, even though progress was extremely slow, for other children she knew could read and among most children it is a highly regarded school activity, perhaps because of its importance in our society. She wanted to

read and showed an interest and, therefore, it was begun at once. Secondly, her teachers were always cognizant even of the smallest amount of growth that was taking place. Perhaps she was not reading text books, but her skills and vocabulary were slowly increasing and these were interpreted as successful advances and certainly very good reasons to continue their efforts. Thirdly, because those around Lynne were always thrilled with her reading progress, and the fact that she was constantly being supplied with new reading books, Lynne's love of books and reading has continually increased.

At 5½ her fine finger development was very slow, but did show some progress. Metal inset frames were taped to a cardboard, paper was inserted between the inset frame and the cardboard and Lynne was able to make vertical lines within the geometric design of the inset frame. Lynne's finger control was not yet developed sufficiently to hold either the frame or the inset itself in place. However, the envelope effect secured her paper in place and she was thereby able to practice this skill.

Math was, and still is, extremely difficult. Lynne could only distinguish between one and many at this time.

In the area of gross motor development, Lynne, (like many Down's Syndrome children), was very hesitant to jump, but did so the summer she turned six. Her first jump from a high position to a lower level was made from the side of a swimming pool into the water. Her mother, standing in the water, held Lynne loosely around the waist for the first few jumps, then progressed to just holding Lynne's hands, and finally was able to release her hold altogether.

Lynne has loved the water since birth. When she was one and two, she never hesitated getting into the baby pool which was separate from the large pool. However, during these early years, she always cried when she was taken into the larger pool, even though she was held firmly and securely. Perhaps, it was the largeness of the pool with its added noise and activity, or the fact that she could not feel the bottom of the pool. Whatever the cause, even though she thoroughly enjoyed the little pool, she did not adjust to a larger pool until she was three or four.

Lynne has taken swimming lessons and can float, swim a few feet by herself (both on the surface and under the water), dive for pennies, and has also begun to dive from a sitting position along the side of the pool.

During her fourth year in school (age 6), Lynne's phonetic reading ability increased. She was shown the moveable alphabet and began using it with some success.

The moveable alphabet consists of individual letters from which a child can phonetically make words. The consonants are red; the vowels are blue. The first words are usually three letter, short ă words, such as m-a-t, c-a-t, etc. Small books were again made consisting only of the words she knew and, consequently, she was able to read by herself. Her first phonetic book simply contained the short ă words: cat, fat, hat, mat, pat, rat, sat. There were no pictures in this book, only the words she knew. Only one word appeared on each page. The words were in large print and the colors correlated with those in the moveable alphabet.

Not only was her reading ability growing, but Lynne was maturing socially. At the end of this school year, she was provided with another valuable experience. Lynne began attending the Museum of Natural History in her city, which sponsors nature classes for children during the summer months. Their youngest class includes children who are five and six years of age. Lynne's mother inquired about the classes. She explained that Lynne had been in school and that she most probably would sit and listen and be most interested in the simple science lessons which were offered. It was understood that she might not comprehend all the information, but would probably grasp a little of the material, and would benefit from the new experience of orienting herself with new children and new surroundings.

No objections were raised, even though the experience was a new one for the Museum as well.

The venture was a complete success. Lynne loved going to her classes and has continued to go each summer.

Of course, each year the degree of difficulty of the classes has exceeded Lynne's growth rate. However, there are still many classes offering nature experiences and non-competitive skills. These are the classes from which Lynne chooses. She is aware of her limitations and will let you know if she doesn't want to participate in a given situation.

The summer Lynne turned nine such a situation developed. Upon observation, it was noticed that Lynne was having difficulty keeping up with the class when they walked to the river. The class was dropped. The following summer, however, one of Lynne's friends decided to take the class. Lynne wanted to be with Amy. Lynne's

gross motor skills had matured somewhat during the year and now at age ten she was able to attend the class without falling behind on the hikes to the river and, therefore, without discouragement.

Lynne's parents feel that Lynne has not and should not be sheltered because of her disability. Her parents have not hesitated in giving Lynne as many "normal" experiences as possible. It is their belief that keeping Lynne integrated with average children has benefited her as well as the other children. Lynne has seen normal behavior patterns and has formed her personality in accordance to that acceptable to her peers. Subsequently, her classmates have grown in understanding and acceptance of handicapped persons.

Dancing has also been included in Lynne's activities. Rather than enter Lynne in a dance class for retarded children, Lynne's mother found a beginning creative movement class that Lynne could attend.

Again, the experience was a success. Lynne has continued with her dancing for the past four years. The class Lynne now attends is composed of seven, eight, and nine year old children. Lynne goes to school with several of the children and feels very comfortable with them. Lynne's dancing teacher is excellent in her approach to creative dance and gives each child every confidence and success. Lynne has learned many ballet steps and positions.

When Lynne was eight and had been dancing for two years, her teacher gave a recital in which each class choreographed their own dance. Lynne participated and performed right along with the others in her class. The audience was unaware of her handicap.

Because of her interest in dancing, Lynne has gone to and appreciated innumerable plays, concerts, and other social and civic events.

Progress has continued slowly but consistantly in all areas. Today, at age 10½, Lynne is reading at a beginning second grade level. Her phonetic skills have improved and she immediately sounds out difficult words. Her sight word vocabulary has also increased. She knows three-fourths of the box of Milton Bradley Sight Words, Group 2, for Grades 1 and 2. The Dr. Suess Beginning Reading Series is her favorite, and she never tires of reading The Cat and the Hat, Green Eggs and Ham, I Wish that I had Duck Feet, and many others. No doubt her ever-present fascination with books, coupled with her own discovery of her reading ability, has heightened her current interest. Whatever the reasons, her current reading ability is very gratifying.

Her fine finger control is improving and she is beginning to practice cursive writing. Here again, her teacher relates that she comes in every morning and immediately wants to begin writing her words. It seems to be "her big work for the day."

Math is still very difficult for her. She is able to rote count to 30. Very often in class the children count off to determine the number in attendance that day. Her present class consists of 25 pupils. Lynne is able to follow the sequential count no matter where she is positioned among the 25 children. She also has number concepts up to 19. Very simple addition problems, specifically all the addition facts adding 1 up to 10 (1+1, 2+1, 3+1, etc.) as well as 2+2 can be done without counters.

Other problems, such as 5+2, 6+3, etc. can be done with concrete counting aids.

She is able to work these same problems on the Addition Strip Board. This is a piece of Montessori material which, while it is still concrete in nature, is a harder form of material to use. It will aid Lynne in the memorization of number facts.

Lynne's knowledge of the decimal system stems from Montessori's golden bead material.

> The following is a description of the golden bead material.....
>
> a. Units are represented with loose beads of gold.
> b. Tens are represented by ten unit beads strung together on a wire bar.
> c. Hundreds are represented by ten bars-of-ten wired together into a square shape, and also by a wooden square the same size as the bead square. On this wooden square, printed circles represent the beads.
> d. Thousands are represented by ten squares of one hundred wired together into a cube shape, and also by a wooden cube the same size as the bead cube. On this wooden cube printed circles represent the beads. (Carinato, 1968, 100)

Lynne is able to do dynamic addition $\begin{array}{r} 4567 \\ +\,2654 \\ \hline \end{array}$ using the golden bead material. While still on the concrete level, the process involved in this math function is very significant for a Down's Syndrome child.

For the last two years, Lynne has comprehended the days of the week and has been able to tell time to the hour. She still has some difficulty with the half-hour concept in time.

In the area of language development, she can pronounce a great many words clearly. Her sentences are oftentimes of six to

eight words in length. However, at present she tries to talk so fast that it is difficult to understand her. No doubt this is hindering her social relationships somewhat.

Socially, while it is still difficult for her to make friends, she does have quite a few. All of her friends are younger, either seven or eight years of age. She is able to ice skate, ride a two-wheel bike(with training wheels), enter into imaginary play (usually with Barbie dolls), and do many other comparable social activities with her friends. She has collected the telephone numbers of all her friends (she knows three or four from memory) and is able to dial the telephone and invite them over to play by herself.

Her total progress to date is very good.

Jennie: Jennie is presently six years old and also has attended the same Montessori school since she was three.

Her early development indicates that she sat alone at nine months, was crawling on her stomach at ten months, and could walk at 22 months. She was toilet trained at 2½ - 3 years of age, which is a very early age for a Down's Syndrome child.

As soon as Jennie turned three (November, 1970) she was tutored for three months by a Montessori teacher before entering the 18 month to 3 year infant class. At this time, there was no usable language. It was very difficult to get her to speak, even though she understood and could have named a great many things.

Jennie had great difficulty in following directions. There seemed to be no sense of limits. She needed to learn what was appropriate and acceptable classroom behavior.

Following her three months of tutored orientation to classroom procedures, Jennie entered the infant class. There were 18 children in this class. This class had a directress and one assistant. Despite the small class, Jennie had a more difficult time adjusting to the classroom environment. Her attention span was unusually short, and she seemed restless. It was harder for Jennie to become accustom to classroom work.

Yet, even though the intial adjustment was hard, Jennie picked up many activities more readily than Lynne had. She also did not show any signs of aggressiveness with any of the other children. At home, she was seldom by herself for she played constantly with the neighbor children across the street. This social awareness was not yet evident in school.

Also, perseveration was not and never has been a problem at any time.

Jennie, like Lynne, had no major health difficulties. She has no heart murmur, nor are there any respiratory problems. Her attendance at school, even during the first years, was consistantly good, and has continued the same.

By the end of Jennie's second year (age 4) she could jump, gallop, climb stairs, with alternating feet going up, and cut with a scissors. These four motor skills could not be performed by Lynne at the same age.

Like Lynne, Jennie could scribble with crayons and draw a circle, pour (with less spilling) and do the posting box. She had not been shown painting or the pink tower as Lynne had been.

This was due primarily to the differences in classes and teachers.

Jennie could match different shapes, an activity Lynne could not do. Colors and pictures and some numerals could be matched, the "shape" puzzle could be completed, and she also could almost sort knives, forks, and spoons. She was successful at pasting and doing sewing cards.

Jennie was also able to put on her coat, hang it on a hanger, undress, button, and work her zipper up and down. She could put on her washing apron.

She was able to identify the parts of her body in the second period of Sequin's "three period lesson."

Following directions and work sequences were performed better than Lynne. Choosing and discriminating were done well and she was able to verbalize her choices, if she chose to speak.

During this second year, she was on the verge of socializing with her peers.

Language was at the one word stage. However, Jennie never spoke voluntarily, she would repeat words only when told to do so. She could reproduce sounds and follow the form of the sandpaper letters. She understood what was told her and could carry out a two-instruction request, whereas Lynne had only been at the one-command stage.

In the spring of this second year, the Montessori school was asked to be on the nationally viewed television show. A few children from each class in the school were chosen to make up a composite television class. It was thought that Jennie's work pattern and ability to concentrate were sufficiently developed that she was one of the children selected for the television class.

The show was a success, and so was Jennie. The studio and cameras did not distract her and she went about her work as usual.

On the whole, Jennie has progressed better than Lynne. Today at the age of six, she has started to socialize more. She still plays a great deal with the children in her neighborhood.

She likewise, still shows a hesitancy to talk, although she understands and could verbalize many responses. If she chooses, she is able to use three word sentences.

Her moveable alphabet work is very good, and she can make words of three letters using all of the short vowels. Such words as cat, hat, sit, and hop are sounded out carefully and the letters are placed on a rug in front of her. However, she has not yet said any of the words back. It is suspected that this is because of her lack of speech. The teacher is, therefore, using pictures to determine if Jennie knows the words. When asked what the letters say, Jennie can place the picture next to the word.

Jennie's math concepts are better than Lynne's were. She is able to not only count to four and identify the number four, but also go to the golden bead material and return with four units.

She is starting to categorize and can sort qualities such as hard and soft, hot and cold, etc.

Jennie's fine finger coordination is ahead of Lynne's at this age. She can make vertical strokes within her metal inset designs and stay within the lines extremely well. Furthermore, she can hold the inset herself. It is not necessary to make an envelope out of the inset frame as it was for Lynne. Along with this, she has not only started to recognize her name,

but has begun to write it as well. She can also draw a square, which is a 5½ - 6 year old ability.

Jennie has started to take on responsibility and will help with such things as getting the other children ready for dismissal and calling their names to go home. She helps clean the room and can now carry out a request of three-instructions. At lunch time, she is able to function completely independent of any assistance. She pours her own milk, opens all her other food containers, and can clean her place when she is finished.

Her work pattern this year has been outstanding. Jennie can occupy herself with meaningful and educational activities for several hours at a time. She has begun to understand yesterday, tomorrow, and today in time concepts, and can also distinguish between morning and afternoon.

Jennie has started to take dancing from the same teacher as Lynne does. She is able to follow the movements and rhythms quite well and seems to enjoy it. Like, Lynne, Jennie also loves the water and is starting to take swimming lessons.

Jennie's parents feel as Lynne's parents do, that Jennie should be in the normal stream of activities. They have taken her to many events, such as plays, concerts, and movies. Jennie's parents have also been able to take her to restaurants for the last several years becuase of her good table manners and polite social behavior.

To date Jennie's progress has also been very good.

In relation to Piaget's Work. Both of the children studied have successfully completed the Sensory-Motor Stage (normally ages 0 - 24 months) of development. The Montessori philosophy is cognizant of repetition in the sense that Piaget envisions it. Sensorial activities are allowed to be repeated many, many times if the child so wishes. For example, pouring, pasting, and sewing were all sensory-skills which Lynne and Jennie were able to perform over and over again, day after day, if they wished.

Their teachers were also most effective in utilizing the principle of imitation in presenting work. Activities were always "shown" in every detail to the girls. After they had carefully watched the activity being performed, they were invited to do it.

Both children began utilizing language. Lynne generally tried to say the name (one word) of the item she wanted, while Jennie chose to rely on non-verbal communication for a longer period of time. She used pointing as her communication tool.

Also, both children began using play as a learning experience. Lynne's play was either confined to an adult-child play relationship much of the time or a self-initiated, self-stimulation play situation. For example, Lynne loved to sit and look through books and magazines. Oftentimes, if her mother was busy, she would initiate this activity on her own. Jennie's play primarily centered around the neighbor children. She would play with them for a couple hours each day. They seemed to enjoy her as much as she enjoyed them.

Lynne has passed through the Pre-conceptual Stage, (usually 2 - 4 years of age). Her play during this stage primarily centered

around her friend next door. They often played for hours re-creating real life situations (such as playing house or school). Her language during this stage became more audible and she began putting two words together. In addition, Lynne began socializing more with the children at school. There was a genuine effort to communicate with the other children and she began wanting to invite them over to play.

Jennie is now operating predominantly in the Pre-conceptual Stage. She still continues to play with the neighbor children and, like Lynne, Jennie is starting to reach out for the other children. She wants to talk to her classmates, and is trying to initiate a play relationship with them. This latter characteristic plus her time concepts (that of yesterday, today, tomorrow, morning, and afternoon) and the ability to categorize qualities (hard and soft, rough and smooth) suggests that Jennie is moving into the Intuitive Stage, (normally 4 - 7 years of age).

Lynne is presently operating in this Intuitive Stage. Her verbal ability has definitely increased (she is able to speak in six to eight word sentences). Her thought processes are maturing as is evidenced by her ability to do dynamic addition with Montessori's golden bead material (this material is explained on page 35). In her play, she is on the verge of passing into the Concrete Operations Stage (normally 7 - 11). She is beginning to illustrate the ability to truly be part of a play scheme involving two or more other children.

In relation to other retarded children. The progress of these two Down's Syndrome girls has in general been outstanding. From surveying the area public schools in April, 1973, it was learned there were no Down's Syndrome children in any of their primary EMR programs. Observation of the retarded children's program and private retarded programs revealed that none of their children of comparable age were reading as well as Lynne and Jennie. Nor were their math concepts as good. In overall growth the two Down's Syndrome children studied were ahead of those observed in other programs.

Returns from a questionaire sent to random Montessori schools throughout the country related that there was a Down's Syndrome child attending a Montessori school in a neighboring city. It was learned that the child seemed to be progressing very well; that there was acceptance and immeasurable assistance from the parents; and that acceptance by the school towards the child was also favorable. The child had attended a 3 - 6 year class and was now functioning in a regular 6 - 9 year old Montessori environment with normal children.

Another Down's Syndrome child (age 4) was found functioning very well in a 3 - 6 year old Montessori environment. It was stated that he could identify such things as animals, numerals (1 - 10), etc. His small muscle control was also reported good. Here again, the parents and school personnel were working acceptingly and sharing empathic concern with the child.

Hence in the two cases sited above, both children, like Lynne and Jennie, were able to adjust well to the environment and were making fine progress academically and socially.

SUMMARY OF IMPLICATIONS

Mentally handicapped children can succeed right along-side normal children in a classroom.

> When all children reach the age of three, regardless of any previous diagnosis, they should be brought together into a pre-school program. No efforts should be made to separate the handicapped for as the children enter these programs, they will identify themselves as slow-learners or handicapped learners through their inability to deal with the assigned material at the expected pace. The children who have a problem with number concepts, for example, need not be labeled as retarded and kept with a retarded group. ... it should be recognized that the handicapped and non-handicapped benefit from interaction with each other, and no thought should be given to a completely separate physical setting unless medical requirements demand it. The children are grouped as their learning, training, or physical needs require and they are integrated whenever this is possible.
>
> When children reach school age, all should be included in school programs regardless of level of retardation. Many of those with developmental delay will, as a result of appropriate pre-school training, be able to work in "regular classes" and the existing Educable Mentally Retarded (EMR) category will no longer be needed as an educational category. ... Those groups which we currently label Trainable Mentally Retarded (TMR) or ineligible for EMR because they test too low should be in special training programs within the school system and should participate with other children within their age group in all activities where such interaction is possible. Parts of the training curriculum may need distinct training equipment, but the fact that this is sometimes necessary is no excuse to make it a completely separate activity, totally away from peers and the normal activities of other children. (Leland, 1973, 25 - 26)

As long ago as the early 1930's, S. A. Kirk (Naumann, 1965) proposed that "all" children be included in the learning environment. The desire to keep retarded children in programs with average children as much as possible was also expressed by educators

working in the retarded children's program that was observed.

The question seems to be in what programs and environments can these children experience success. Certainly the learning environment in which Lynne and Jennie have grown has afforded them great success. Neither girl has met with over-frustration or defeat. As evidenced from this study, Montessori environments can make the "common humanity" classroom concept feasible and successful.

The following criteria needs to be re-emphasized:

First, there needs to be an age-span within the classroom so all of the children are on different levels of learning. This insures truly individualized activities and reduces comparison.

Second, the size of the class need not be extremely small nor the staff enlarged. On the contrary, a larger class (about 25 children) with one teacher and one assistant protects the children from becoming too dependent upon adults.

Third, didactic, sensorial materials need to permeate every aspect of the learning situation.

Fourth, academic and social expectations for these children need to be raised. If allowed to advance on their own, they can far surpass present accepted standards.

Fifth, independence and self-direction is a learned behavioral trait and can be taught to retarded children. It should be noted that after the initial introduction to classroom procedure, each of the subjects learned to function by themselves in class. Their teachers always presented one lesson per day to each of the girls. Beyond this, they were of no extra burden to

their teachers and were able to advance on their own.

If such an environment does, indeed, benefit all children in that they are able to develop their "whole" being, hopefully future generations will be more tolerant, more accepting and more loving towards all individuals, regardless of their disability.

APPENDIX I

The following is a list of Montessori activities and apparatus which R. C. Orem has witnessed being used by special children in Montessori schools:

I. Exercises of practical life

A. Grooming and care of one's person
- washing hands
- combing hair
- brushing teeth
- cleaning and polishing shoes
- brushing and hanging up clothes
- dressing and undressing
- buttoning, zipping, snapping, lacing, etc.

B. Helping to maintain order and attractiveness in ones environment indoors
- sweeping
- dusting
- cleaning and waxing floor
- cleaning and waxing furniture
- polishing metal objects (brass, silver, etc.)
- cleaning windows, mirrors, pictures
- cutting and arranging flowers

C. Working outdoors
- weeding
- lawn care
- raking
- planting
- watering plants
- care and feeding of animals, fowl
- picking fruit and gathering vegetables

D. Activities centering on snacks and meals
- washing and preparing vegatables, cutting, slicing, paring, etc.
- pouring, stirring, mixing, etc.
- setting the table
- serving at table
- eating, drinking, using utensils, napkins, etc.
- clearing the table
- washing, drying, and putting away dishes

E. Etiquette and social relations
offering assistance
receiving visitors
entering and leaving a room
giving thanks
asking permission
apologizing
telephone courtesy
not disturbing others, or their work

F. Motor coordination and control
sitting down and rising quietly
good posture when standing
walking, without bumping against people or furniture
walking on line
silence game
lifting
carrying furniture, alone and with others
climbing
dressing frames
sorting, stacking, inserting, matching, tying, etc.
using scissors, art materials, writing implements.

G. Exercises with water and other liquids
pouring, filling containers, changing water in flower vases, washing, soaking, rinsing, wringing etc.

H. Exercises in carrying
carrying jugs, glassware, basin, chairs, rolled-up carpet, etc.

I. Exercises in folding
folding tablecloths, napkins, newly-ironed linen, etc.

J. Exercises in opening and closing
opening and closing, quietly, room doors, cupboard and closet doors, windows, drawers, cabinets, etc.

II. Sensorial materials and exercises

A. Visual
pink tower
broad stair
long stair
solid wooden insets
knobless cylinders
geometric cabinet
constructive triangles
color tablets

B. Auditory
sound boxes
bells
exercises with a watch

C. Tactile
touch boards
touch tablets
collection of materials (silk, wool, etc.)
collection of grains (rice, corn, etc.)

D. Olfactory
smelling boxes and jars

E. Gustatory (taste)
taste bottles (sweet, salt, acidic, etc.)

F. Combined Senses
thermic bottles and tablets
baric tablets
stereognostic exercises
geometric solids
binomial and trinomial cubes
mystery bag

III. Preparation for and progress in writing, reading, mathematics
plane insets
metal insets
sandpaper letters and numbers
moveable alphabet
various geometric forms
phonogram materials
word games
concrete objects
grammar objects
reading symbols
reading analysis
language cards, definitions, nomenclature
reading and writing: words, sentences, stories
numerical rods
counting sticks
card and bead material for decimal system
boards and charts for : addition, subtraction, multiplication, division.

IV. Creative expression
paper cutting, pasting
making colored designs with insets
didactric material for music
free-hand drawing
painting
clay modeling
reading and writing poetry and prose
dramatics

V. "Cultural Input"
charts, cards, puzzles, maps, models
time-lines, books, etc., for such subjects as
history, geography, botany, zoology

This system of activities and apparatus can help the special child (within the limits of his potential) in such ways as the following:

1. Provide necessary order and structure
2. Improve motor behavior, coordination, body imagery
3. Improve perceptual functioning: perception of time, space, form, texture, size, and other dimensions.
4. Increase independence through acquisition of self-care skills.
5. Arouse and hold learner's attention, and develop his concentration.
6. Develop social skills, deportment, and self-discipline.
7. Improve language reception (listening, reading) and expression (speaking, writing).
8. Develop habits of order and work.
(Orem, 1970, 55 - 60).

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